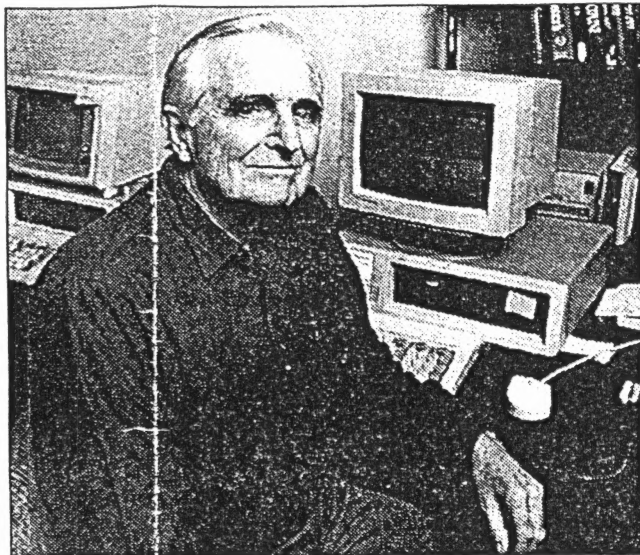


The Computer World, Indivisible



Photographs by Susan Spann for The New York Times

Douglas Engelbart of Bootstrap, engineer.

, they say a version of the be ready — for testing — in year. "We're doing our best is down until we have some- ow," said Chris Hibbert, who software development.

be a database program to help ether and keep track of docu- ple, an architect might be a spot on a blueprint and mp'to a memo explaining the hat part of the design. Some- document that quotes from ent will be able to jump in-

f light without damage.) smits the laser with little d is flexible, a crucial factor, lists.

rise won approval from the Administration to market the use on soft tissue in the procedures as gingivecto- r and minor surgery. e \$50,000-plus lasers have se said.

ssiliadis, president and chief rise, who has tried the laser most patients do not feel work is being done. "Some ng or a slight warmth, but not registers as pain," he said.

ne F.D.A. authorized testing on hard human tissue — teeth BARBARA PRESLEY NOBLE

stantly to the source document. Users will be able to comment on something they read, and other readers will be able to jump from the document to those comments. People will also be able to put detectors into documents, to alert them automatically if someone subsequently comments on a particular passage.

A key to Xanadu is that each piece of information is stored only once but can be incorporated into many different documents, thereby saving disk space. On paper, if an author excerpts a passage from another person's work, he or she copies it, so that passage now exists both in the original and in the new work. But in Xanadu, the new document only creates a link to the excerpt in the original document. One byproduct is that this allows the system to keep track of who is quoting whom, thus providing a basis for royalty payments on copyrighted material.

When, or if, Xanadu finally appears, Autodesk is expected to sell it to corporations. But Mr. Nelson wants to create a Xanadu for public use, to store and collect the knowledge of the world. That will require new funding and, the 54-year-old Mr. Nelson concedes, will take the rest of his life.

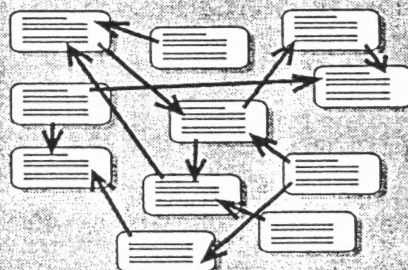
For the 66-year-old Dr. Engelbart, the idea is to help organizations make faster and better decisions. It was in working toward that goal in the 1960's, when he was at the Stanford Research Institute, that Dr. Engelbart came up with ideas like the mouse, windows and hypertext.

In 1977, Dr. Engelbart moved to Tymshare Inc., a computer service provider that sold his system under the name Augment (as in augment human intelligence). But Augment was offered on big computers, and business faded when personal computers proliferated.

In 1989, Dr. Engelbart set up the Bootstrap Project to try to interest companies in using his techniques to "bootstrap" themselves

A Library at Your Fingertips

Hypertext can be envisioned as data arranged on imaginary notecards. The reader jumps from card to card, choosing his or her own path through the material.



Source: Theodor H. Nelson

The New York Times

toward better performance. Initial funding came from Apple Computer, Sun Microsystems and Mitch Kapor, the founder of the Lotus Development Corporation.

But that funding ran out and, partly because times are tough, partly because Dr. Engelbart's ideas are somewhat difficult to understand, has not been replaced. He now runs Bootstrap with his daughter Christina Engelbart, operating out of a donated office in Fremont, Calif., and trying to keep the project alive with seminars and videotapes.

It might seem that Dr. Engelbart and Mr. Nelson could join forces. Indeed, Dr. Engelbart thought of using Xanadu as the underlying software upon which he could build a new version of Augment. But he could not reach an agreement with Autodesk.

Both men now face advancing age and competition from numerous other companies already producing software that helps workers collaborate and keep track of documents. Lotus's Notes program is one example.

Both Mr. Nelson and Dr. Engelbart think these solutions fall short of their ultimate visions. But perhaps that is how the technology is destined to develop, piece by piece rather than in one all-encompassing leap. In that sense, these developments by others are not so much a threat to the two pioneers as a sign that their visions will be realized, though perhaps not by themselves.

"Doug is like Moses," said Paul Saffo, a researcher at the Institute for the Future in Menlo Park, Calif. "He's leading us toward the information Promised Land but he will probably never enter it himself." Mr. Saffo also doubts that Mr. Nelson's Xanadu will ever be finished.

"Neither will probably ever reach their goals," he said. "But even if they fall short, they fall forward, and all of us benefit." ■